

# DR. EVA C. HERBST

## POSTDOCTORAL FELLOW IN SHOULDER BIOMECHANICS

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[Website](#) - [GoogleScholar](#) - [Github](#) - [Figshare](#) - [Morphosource](#) - [Publons](#) - [Orcid](#)

## EDUCATION

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OCT 2016 - APRIL 2020	PhD in Biomechanics and Palaeontology <i>Structure and Motion Lab, Royal Veterinary College, London</i>
AUGUST 2012 - MAY 2016	B.A. in Integrative Biology <i>U.C. Berkeley</i>
OCT 2013 - JUNE 2014	Degree of Higher Education in Biomedical Sciences <i>Durham University, Year of Study Abroad, Certificate of Higher Education</i>

## EMPLOYMENT & RESEARCH EXPERIENCE

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MAR 2023 - PRESENT	Postdoctoral Fellow <i>Computational Shoulder Biomechanics, ETH and Schulthess Clinic, Zurich</i>
DEC 2019 - PRESENT	Postdoctoral Researcher <i>Investigating form and function of Triassic reptile skulls, Palaeontological Institute and Museum, University of Zurich</i>
OCT 2019 - PRESENT	Lead Researcher OATech+ Network Pump Priming Project <i>Analysing bony architecture to monitor osteoarthritis of the knee Royal Veterinary College, London and University of Zurich</i>
OCT 2019 - DEC 2019	OATech+ Network Early Career Researcher Placement <i>Osteoarthritis project, Skeletal Biology Group, Royal Veterinary College London</i>
OCT 2016 - APRIL 2020	PhD in Palaeontology and Biomechanics <i>Structure and Motion Lab, Royal Veterinary College, London</i>
MAY 2016 - JUL 2016	National Science Foundation Research Experience for Undergraduates Project: <i>Comparative Biomechanics, Palaeontology, and Evolution, University of Missouri</i>
SEP 2015 - MAY 2016	Undergraduate Research Apprenticeship Program <i>Hummingbird Flight Analysis, U.C. Berkeley</i>
SEP 2014 - MAY 2016	Research Assistant and Archivist <i>Human Evolution Research Center, U.C. Berkeley</i>
JUN 2013 - MAY 2016	Research Intern and Staff <i>Safari West Osteology, Santa Rosa, California</i>
SEP 2014 - MAY 2015	Undergraduate Research Apprenticeship Program <i>Rodent Mandible Morphology Project, U.C. Berkeley</i>

## HONORS & AWARDS

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2021	<b>D. Dwight Davis Award, Society of Integrative and Comparative Morphology</b> Best student oral presentation in the Division of Vertebrate Morphology
2020	<b>Swiss Commission of Palaeontology Prize</b> Best presentation in palaeontology given at the Swiss Geoscience Meeting
2016	<b>Franklin M. Henry Award, Integrative Biology, UC Berkeley</b> Outstanding achievement in human performance and health research
2016	<b>Distinction in General Scholarship, UC Berkeley</b> Awarded to graduates achieving high grade point average
2013, 2015	<b>Dean's Honors, UC Berkeley</b> Awarded to graduates achieving high grade point average

## PEER-REVIEWED PUBLICATIONS

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\* denotes co first author

2023	Merten, L.J.F, Manafzadeh, A.R., <b>Herbst, E. C.</b> , Amson, E., Tambusso, P.S., Arnold, P., Nyakatura, J.A. The functional significance of aberrant cervical counts in sloths: insights from automated exhaustive analysis of cervical range of motion. <i>In Press for Proc. R. Soc. B.</i>
2023	<b>Herbst, E. C.*</b> , Evans, L.A.*, Felder, A.A., Javaheri, B. and Pitsillides, A.A. 3D profiling of mouse epiphyses across ages reveals new potential imaging biomarkers of early spontaneous osteoarthritis. <i>Journal of Anatomy</i>
2023	Demuth, O. E., <b>Herbst, E. C.</b> , Polet, D. T., Wiseman, A. L. A., Hutchinson, J. R. Modern three-dimensional digital methods for studying locomotor biomechanics in tetrapods. <i>Journal of Experimental Biology</i>
2022	<b>Herbst, E. C.</b> , Lautenschlager, S., Fioritti, N., Meade, L., Scheyer, T.M. A toolbox for the retrodeformation and muscle reconstruction of fossil specimens in Blender. <i>Royal Society Open Science</i>
2022	<b>Herbst, E. C.</b> , Eberhard, E., Richards, C., Hutchinson, J.R. <i>In vivo</i> and <i>ex vivo</i> range of motion in the fire salamander <i>Salamandra salamandra</i> . <i>Journal of Anatomy</i>
2022	<b>Herbst, E. C.*</b> , Eberhard, E.*, Hutschinson, J. R., Richards, C. Spherical frame projections for visualizing joint range of motion, and a complementary method to capture mobility data. <i>Journal of Anatomy</i>
2022	<b>Herbst, E. C.*</b> , Manafzadeh, A. R.*, Hutchinson, J. R. Multi-joint analysis of pose viability and supports the possibility of salamander-like hindlimb configurations in the Permian tetrapod <i>E. megacephalus</i> . <b>Student Awardee Paper.</b> <i>Journal of Integrative and Comparative Anatomy</i>
2021	<b>Herbst, E. C.</b> , Lautenschlager, S., Bastiaans, D., Miedema, F., Scheyer, T. M. Modeling tooth enamel in FEA comparisons of skulls: comparing common simplifications with biologically realistic models. <i>iScience</i> 24(11)
2021	<b>Herbst, E. C.</b> , Felder, A. A., Evans, L. A. E., Ajami, S., Javaheri, B., Pitsillides, A. A. A new straightforward method for semi-automated segmentation of trabecular bone from cortical bone in diverse and challenging morphologies. <i>Royal Society Open Science</i> 8(8). Our image was selected for the <a href="#">journal cover</a>

- 2020 | Ortega-Jimenez, V. M., **Herbst, E. C.**, Leung, M. S., and Dudley, R. Natural barriers: waterfall transit by small flying animals. *Royal Society Open Science* 7201185
- 2019 | **Herbst, E. C.**, Doube, M., Smithson, T. R., Clack, J., and Hutchinson, J. R. Bony lesions in early tetrapods and the evolution of mineralized tissue repair. *Paleobiology* 45(4)
- 2010 | **Herbst, E. C.** and Hutchinson, J. R. New insights into the morphology of the Carboniferous tetrapod *Crassigyrinus scoticus* from computed tomography. *Earth and Environmental Science Transactions of The Royal Society of Edinburgh* 109(1-2)

## GRANTS & FUNDING

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- 2023 | **Digital Switzerland Boost Programme**  
grant for attending Advanced 3D Slicer Programming Course  
Funds: 420 CHF
- 2021 | **ImagingBioPro Network Online Educational Material Grant**  
development of educational materials (videos and guides) and code: [mesh manipulation](#) and [trabecular segmentation](#)  
Funds: 1,000 GBP
- 2020 | **University of Zurich GRC Grant**  
Project: organized and hosted finite element analysis [conference](#) and [workshop](#) with over 200 participants and developed a [website](#) and [Github organisation](#) for sharing finite element modeling methods  
Funds: 10,000 CHF
- 2019 | **OATech+ Network Biomechanics and Mechanobiology Pump Priming Fund**  
Project: Using 3D trabecular architecture as a biomarker to identify and monitor osteoarthritis of the knee  
Funds: 10,000 GBP
- 2019 | **OATech+ Network Early Career Researcher Placement**  
Placement with Prof Andrew Pitsillides at RVC to work on osteoarthritis project (see above)  
Funds: 3,000 GBP
- 2019 | **Royal Veterinary College Foreign Travel Fund**  
To present research at ICVM conference  
Funds: 300 GBP
- 2018 | **Royal Veterinary College Foreign Travel Fund**  
To present research at SICB conference  
Funds: 300 GBP
- 2016 | **Research Experience for Undergraduates, National Science Foundation**  
Biomechanics research internship, University of Missouri  
Funds: 3,500 USD

## CONFERENCE PRESENTATIONS & INVITED TALKS AND WORKSHOPS

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- gave 10 invited talks and 10 international conference presentations, and collaborator or mentor on 13 additional conference presentations
- winner of 2 awards for best talk
- please see a full list of my talks [here](#)

## TEACHING & SUPERVISION

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TEACHING	<ul style="list-style-type: none"><li>• Bio 262: Evolutionary Morphology of Vertebrates: Issues and Methods, University of Zurich. Leader of Practicals. 2021,2022</li><li>• Bio 267, Paleobiology and Evolution of Vertebrates, University of Zurich. Leader of Practicals, 2021,2022</li><li>• Lectures: <i>Using Computer Tools to Investigate Biomechanics of Animals</i>, Bio 262 &amp; 267, 2020-2022.</li></ul>
SUPERVISION	<ul style="list-style-type: none"><li>• supervision of 2 Master's thesis projects and 1 Master's semester project in Biomechanics, ETH (current)</li><li>• Kehan Pan, Semester Project FEA, ETH, Zurich (2022)</li><li>• Dylan Bastiaans, PhD student Digital Palaeontology and Biomechanics, UZH (2019-2023)</li><li>• student course projects in Bio 262 and 267, UZH (2019-2022)</li></ul>
TUTORING	<ul style="list-style-type: none"><li>• Postgraduate Writing Tutor, Royal Veterinary College, London (2017-2019)</li><li>• Private Tutor (Writing, Math)</li></ul>

## TECHNICAL SKILLS & PROGRAMS

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CT SEGMENTATION AND 3D MODELING	Mimics, Avizo, Blender, Rhino, photogrammetry
ANALYSIS AND SCRIPTING	Matlab, Python, Java
FINITE ELEMENT ANALYSIS & MULTIBODY DYNAMICS	Hypermesh, Abaqus, Artisynt
SCIENTIFIC ROTOSCOPING AND ANIMATION	Maya
MOTION CAPTURE	Qualysis and Matlab
VERSION CONTROL, FORMATTING	Git, Latex
OTHER	Joint dissections

## OPEN ACCESS WORK

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NEW METHODS/CODE	<ul style="list-style-type: none"><li>• Python-based <a href="#">Blender plugin</a> for modelling 3D muscles</li><li>• <a href="#">method for visualizing joint range of motion</a></li><li>• method for <a href="#">automatic segmentation of trabecular bone</a> featured in <a href="#">Avizo webinar</a></li><li>• <a href="#">Blender remeshing guide</a> for FEA</li></ul>
FEZ INITIATIVE	Founder of <a href="#">Finite Element Zurich</a>
CT DATA AND 3D MODELS	available on <a href="#">Morphosource</a> and <a href="#">Figshare</a>
OPEN ACCESS COURSE	Completed <a href="#">Open Life Science Program</a> fall 2020

## PROFESSIONAL SERVICE & LEADERSHIP

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2021 - PRESENT	Leading Artisynt Software Discussion Group
2020	organized <a href="#">Finite Element Analysis Conference and Workshop</a> (200+ participants)
2018	Session Chair, Society of Integrative and Comparative Biology Annual Meeting, San Francisco.

PEER REVIEW | PNAS, Clinical Biomechanics, The Anatomical Record, Journal of Anatomy, Integrative Organismal Biology, Methods in Ecology and Evolution Integrative and Comparative Biology, Canadian Journal of Earth Sciences

## OUTREACH & VOLUNTEERING

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2021 - PRESENT | Volunteering as English and Math tutor for refugees  
Students Across Borders

2022 | Outreach video for [Biomechanics Research and Innovation Challenge](#)

2020 | [Interview](#) with Real Scientists DE (in German)

2019 | Outreach display, Early Tetrapod Evolution  
Night at the Vet College, Royal Veterinary College, London

2017 | Outreach display, Early Tetrapod Evolution  
Annual Open Day, Royal Veterinary College, London

2017 | Guest [blog post](#) about *Crassigyrinus* on Anatomy to You blog

2013-2016 | Comparative anatomy outreach events at Safari West Wildlife Park

## PROFESSIONAL DEVELOPMENT & CERTIFICATES

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2023 | Advanced 3D Slicer Course: Scripting and Customization, [Kitware](#)

2022 | Good Clinical Practice [online course](#) and certification

2022 | Data Analysis for Medical Research using R, UZH

2021 | [GAMMA](#) Workshop Balgrist, Zurich: "Models, methods and functional tests in motion analysis". Accredited by Swiss Orthopaedics (6 credits) and Physio Swiss (12 credits)

2021 | [Scientific Programming with Python](#), Physics Department, UZH

2020 | [Open Life Science Course](#)

2020 | [SlicerMorph 3D Morphometrics Course](#)

2019 | Avizo Course, 3DMAGINATION Ltd.

2018 | MatLab Fundamentals Course

2017 | Teaching and Learning in Higher Education Certificate, Royal Veterinary College, London

## LANGUAGES

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ENGLISH: | fluent

GERMAN: | fluent